

CLAIMS

1. Antenna system for transceiving signals on two frequency bands, in which two or more microstrip antennas (1A, 1B, 1C, 1D) are arranged on a single dielectric substrate (2), provided with a ground plane (3), characterised by the fact that each of said antennas is capable of operating simultaneously on a lower frequency band (λ_0) and on a higher frequency band (λ_1), is provided with a single feed connection (6) and is positioned to ensure decoupling with the other antennas better than -20 dB in the same frequency band.
2. Antenna system according to claim 1, characterised by the fact that the antennas (1A, 1B, 1C and 1D) are arranged on the upper side of the dielectric substrate (2) and are reciprocally distanced by $0.0276\lambda_0$ (D1) and $0.132\lambda_0$ (D2), with a tolerance of $\pm 10\%$ on the indicated quantities.
3. Antenna system according to claim 1, characterised by the fact that the antennas (1A, 1B, 1C and 1D) are arranged to mirror either one or both of the symmetry axes of said rectangular substrate (2).
4. Antenna system according to claim 1, characterised by the fact that each antenna (1A, 1B, 1C and 1D) is of the PIFA type, equipped with a radiating element for each frequency band and two short-circuits (4, 5) which are arranged on the short side of the antenna on the edges of the dielectric substrate (2) and are connected to the radiating elements of the ground plane (3).
5. Antenna system according to claim 1, characterised by the fact that said dielectric substrate (2) has a dielectric constant equal to 2.33 and a thickness (H) equal to 1.6 mm, with dimensions equal to $0.21\lambda_0$ (W) for $0.42\lambda_0$ (L) and a tolerance of $\pm 5\%$ on the quantities shown.
6. Antenna system according to claim 1, characterised by the fact that said ground plane (3) is arranged on the lower side of the substrate (2), is extended on the entire surface and has a thickness of more than 10 μm .
7. Antenna system according to claim 1, characterised by the fact that each of said antennas (1A, 1B, 1C, 1D) has dimensions equal to $0.144\lambda_0$ (L1), $0.0792\lambda_0$ (W1), $0.0912\lambda_0$ (L2), $0.0408\lambda_0$ (W2) and $0.0024\lambda_0$ (G), with a tolerance of $\pm 5\%$ on the quantities shown.
8. Antenna system according to claim 1, characterised by the fact that said short-circuits (4, 5) has a thickness equal to $0.0096\lambda_0$ (S), with a tolerance of $\pm 5\%$.

9. Antenna system according to claim 1, characterised by the fact that each antenna is fed in position $0.0144\lambda_0$ (C1) and $0.0264\lambda_0$ (C2), with a tolerance of $\pm 5\%$ on the quantities shown.
- 5 10. Antenna system according to claim 1, characterised by the fact that said upper frequency band has a wavelength at the resonating frequency (λ_1), which is approximately half of that (λ_0) of said lower frequency.
11. Multichannel mobile transceiving apparatus characterised by the fact that it comprises:
- 10 - Several transceivers capable of operating on different frequency bands and/or on different channels in the same frequency band;
- a planar multiple antenna, comprising a system of antennas made according to any of the previous claims, in which each antenna is connected to a corresponding transceiver of said transceiving apparatus.
- 15 12. Apparatus according to claim 11, in which said transceivers operate in the GSM900 and GSM1800 bands.